

radical leaves are 4 inches in length, 2 inches broad, upon a petiole $1\frac{3}{4}$ to 2 inches: the cauline leaves are $1\frac{1}{2}$ inch long, 1 inch broad, on a petiole of 3 lines; the peduncles are $1\frac{1}{2}$ inch, the calyx 8 lines long, swollen in the middle, 4 lines in diameter, and 10-nerved: the corolla is nearly 2 inches long, $1\frac{3}{4}$ inch diameter across the mouth, which is obsoletely 5-lobed. In all the other species of *Nolana* mentioned in the work above referred to, the calyx is described as being deeply 5-cleft, with the divisions sagittate or cordate at the base, as in our well-known garden species *Sorema prostrata*; but in the plant under consideration the calyx is said to be distinctly ventricose and striated, which agrees with the character of *Cacabus*.

XXIX.—On the extinct and existing Bovine Animals of Scandinavia. By Prof. NILSSON of Lund*.

Of the Ox kind (*Bos*, Linn.).

Head oblong with broad muzzle† in which the nostrils project forward, open; no lachrymal fossæ; the ears pretty long, oval.

Horns for the most part round, near the roots annular according to their growth‡, otherwise smooth; with roots pointing outwards and curved in different directions, according to the various races.

Body heavily built; loins angular, not round; stout, short, not high-boned, and broad. The female is provided with four teats.

Tail long, pendent; at the end it is furnished with a tuft of long hairs.

Teeth, the grinders with the internal and external borders parallel. *Skull*: no opening between the facial bones above or in front of the orbits over the eyes, as in the Deer tribe. The lachrymal bones flatter, not hollowed out. The spinal process of the anterior vertebræ particularly strongly developed, to serve as attachment for the strong neck-muscles and ligamentum nuchæ which support the heavy head.

The animals belonging to this class, with few exceptions, are the largest and strongest built of ruminating horned cattle. In a wild state they always live in herds under the guidance of some strong pugnacious bulls; wandering from one track to another; at one time seeking the forests, at another the plains; at another, mountains and table lands; and at other times low and marshy places. They seek grassy spots, for their chief food consists

* Translated from his 'Skandin's Däggdjur.' 8vo, 1848, pp. 536-574

† The naked part where the nose ends is so called; it comprises the upper lip and that portion between the nostrils.

‡ Whence the age of the animal is determined.

of grass: they often devour green leaves and young tender branches, and these generally, besides the leaves of the pine and mosses, are their principal food during the winter in cold districts. (I am not here speaking of cattle that are housed.) They live like all ruminating animals (perhaps with the exception of the roe kind), and like their representatives among birds, viz. gallinaceous domestic fowls, in a state of polygamy; and like these, congregate, particularly at pairing-time, in flocks, when the forests resound and the fields echo with their loud cries. During this time, obstinate conflicts take place between the males, and the strongest are those which perpetuate the breed. Their cry is usually lowing, with some it is more grunting. They do not breed more than once a year, and the female seldom brings forth more than one calf at a time.

Before showing from whence our domesticated races and those of other states of Europe are derived, I consider it more desirable first to describe the *wild species*, the *fossil bones* of which have been found in the turf-bogs in the south of Scania. These are divided into those which have—

a. The forehead more long than broad, more or less flattened, the horns growing from the extremity of the angle which divides the vertex from the occiput; the intermaxillary bone generally reaches up to the nasal bones. To this class belong—

1. Uroxen (*Bos Urus*, Antiqu.* *Bos primigenius*, Recentiorum).



Bos primigenius, Recentiorum.

The forehead flat; the edge of the neck straight, the horns

* The denomination Urox is derived from that language which the Ger-

very large and long, near the roots directed outward and somewhat backward, in the middle they are bent forward, and towards the points turned a little upward.

SYNONYMY. *Urus*, Jul. Cæsar, Bell. Gall. vi. cap. 28. Plinius, Hist. Nat. ii. cap. 37. Gesner, Hist. Animal. (Frankfort, 1620) i. p. 145 with fig.; *ibid.* p. 137 (skulls). Cuvier, Ossem. Foss. iv. p. 150. tab. 11. fig. 1-4; 12. fig. 3-8 (skulls). Retz. Vet. Akad. Handl. 1802, p. 282.
The *Wild Ox*, Griffith, Animal Kingdom, iv. p. 111. *Bos primigenius*, Bojanus, Acta Acad. Cæsar. Leopold. Carolin. tom. xiii. p. 422. pl. 11. N.B. I have not this treatise at hand.

Description.—This colossal species of Ox, to judge from the skeleton, resembles almost the tame ox in form and the proportions of its body, but in its bulk it is far larger. To judge from the magnitude of the horn-cores, it had much larger horns, even larger than the long-horned breed of cattle found in the Campania of Rome. According to all the accounts the colour of this ox was black; it had white horns with long black points; the hide was covered with hair like the tame ox, but it was shorter and smooth, with the exception of the forehead, where it was long and curly.

The only specimens which we now possess of this extinct wild ox, are some *skeletons* dug up, of which two are at present preserved here at the Museum of the University, where are also preserved about a dozen skulls of earlier and later specimens.

THE SKELETON.—*Skull.*—The forehead smooth between the

manic race seems to have had in common in the earliest times, and signifies *forest ox, wild ox* (*Bos sylvestris*): for *Ur*, or *Or*, signifies *forest or wood, wilderness*, and is still used in many places in Sweden, Norway and Iceland. That the old word *Ur* or *Urd* was changed to *Or, Ore, Ora*, is shown by the word *Orrhöns*, which by the common people in Scania is called *Orhons*, and in many places in Norway it is called *Urhöns*. The stony and wild tracts which surround the base of the mountains are called in Norway *Ore*, in Iceland *Urd*. In Scania there still exist many old forests which bear the name of *Ora*, and the peasants in some parts of the country say indifferently *kora till oran* and *kora till skogen*, which is in both instances “drive to the wood.” Also in the older German, *Ur* signifies *wood, forest*, but has in compositions of later times been changed into *Auer*; ex. gr. *Auerochs, Auerhahn*. The Romans, when in Germany, first heard the word *Urocs*, and as they generally changed all names after the form of their own language, turned it into *Urus*. The Uroxen which were conveyed to Rome, and highly prized in the bull-fights of the circus, were by the ignorant confounded with the African *Antelope Bubalis*, wherefore the Urox sometimes by the Latin authors is mentioned under the name of *Bubalus*,—an error which Pliny notices.

By our forefathers in Scandinavia as well as in Germany this wild animal is, however, not called *Urox*, but *Ur* or *Ure*, as in the poem of the Nibelunge, v. 3762, thence *Urahorn* in our old Sagas. In certain provinces an angry mad bull is still called *Ure*. The Canton of Uri in Switzerland takes its name from this animal, and bears a bull's head in its arms.

roots of the horns, but lower down more or less hollowed out. The nasal bone reaching up to the line drawn between the lower borders of the orbits; the lower part of the lachrymal bones a little broader than the upper; the distance between the orbits and the bases of the horns is double the diameter of the orbit; the occipital ridge straight or rounded off backward from the base of one horn to the other, and hollowed out below so that it forms an acute angle; foramen occipitale somewhat higher than broad; the horn-cores without pedicles, but with a broad knotty ring round the root, are near the root directed outwards and somewhat backwards, in the centre curved forwards with the points upwards*. The outer edge of the zygomatic process of the temporal bone forms a right angle. A right line drawn between the points of the horns falls over the roots of the horn, between them and the orbits. *Atlas*: its wings curved backwards, oblique, much broader at the back, 10 inches 3 lines in breadth, the upper arch convex, the lower with a compressed hump over the hinder edge. *Epistropheus* short, the processus spinosus a high rising ridge, inclining backwards, whose outer edge is thin, the anterior angle rounded: along the under side of the vertebra is a ridge which passes backwards over the edge of the cup-formed articular surface; *foramen medullæ spinalis*, in front round, back above cylindrical, below flat. The arterial foramen oval.

The remaining bones in the skeleton resemble those of the tame ox, with the exception of their magnitude, and like this species, the Urox has thirteen pairs of rib-bones and six lumbar vertebræ. As it would be far too diffuse to describe every single bone, I will only give the dimensions of those which are dissi-

Fig. 2.

*Bos primigenius.*

* Precisely such a direction have the horns of our tame oxen, quite contrary to the assertion of Bojanus and many others, who, in the unlike direction of the horns, choose to find a specific difference between the *Urus* and the *Taurus*.

milar in the skeletons. The whole length* of the skeleton from the nape to the end of the rump bones (*ossa ischii*) 9 feet.

The length of the head from the anterior border of the ossa intermaxill. to the occipital ridge.....	ft.	in.	lin.
	2	4	4
Thus the whole length of the animal about	11½ to 12		
The height over the mane about.....	6 to 6½		

The other dimensions.

The length from the horn-cores to the intermaxillary bone's anterior edge	2	1	5
The length from the orbit's lower edge to ditto...	1	3	4
" " horn base to the orbits.....	0	6	4
" " horn-core's concave side ...	1	6	6
" " horn-core's convex side ...	2	2	0
The under jaw from the angle to the point	1	8	0
The molar series in the upper jaw.....	0	7	4
Breadth of the forehead between the upper part of the crown of the horn	0	9	1
Breadth of the forehead between the lower parts of ditto.....	1	0	2
Breadth of the forehead between the orbit's upper part	1	0	2
Breadth of the forehead between the orbit's lower part	0	11	4
Breadth between the intermaxillary bone's upper parts.....	0	3	2
Breadth between the apertures of the ear in a line	1	0	4
Distance between the points of the horn-cores ...	2	4	0
The circumference of the crown of the horn	1	2	4

* I have at hand, in the Museum here, a complete and an incomplete skeleton of this species; besides from ten to twelve skulls both of younger and older; also many different loose bones from various parts of the body. When I wrote the first edition of this work twenty-seven years ago, I had seen skulls only of this colossal species; I came however to the conclusion, upon comparing them with the skulls of tame oxen, that the animal must have been about 11½ feet long and 6 feet high, which comes the nearest to the proportion. But I insert here the whole note:—

“From these measurements (of the skull of an Urox) an idea may be formed of the magnitude of the Urox, which certainly far surpassed that of all existing European animals. To judge from the proportions of the parts to a tame bull, the head of the Urox shows that it must have been an animal that from the nape to the root of the tail measured nearly 11½ feet, and in height over the mane about 6 feet. In the Museum of the Royal Academy are fragments of the cranium of the Urox, which must have belonged to an animal more than 12 feet in length and 6½ feet high. On one, the distance between the base of the horns above is 9½ inches, below 13½ inches, the thickness at the root 15 inches. The largest Scanian ox I have seen, and which was of an unusually large size, measured in length from the nape to the root of the tail 8 feet, and was 5 feet high over the mane. When we now consider that *bulls* and *cows* never reach the size that castrated *oxen* do, and that we ought to compare the bull or the cow with the wild ox kind, we shall then easily perceive that this last-mentioned was much larger than the tame ox, and perhaps he was even somewhat bigger in the southern regions, for example in Germany, than here in Sweden.

“Cæsar's account that the *Urus* was *magnitudine paulo infra Elefantos*, was not so exaggerated as one has imagined.”

The body.

	ft.	in.	lin.
The length of the spinal column to the last dorsal vertebra	7	7	4
The length of the spinalcolumn further in a right line to the upper tuber ischii	0	9	0
The length of the neck from atlas to and with the last neck vertebra	1	11	4
Greatest length of one of the middle ribs without the cartilage.....	2	5	0
Breadth	0	2	5 to 6

The extremities.

The length of shoulder-blade	1	8	0
Breadth of its base	1	0	0
The length of os humeri between the articulations	1	2	0
" " radius	1	2	4
" " ulna with olecranon	1	7	6
" " olecranon from the articulation ...	0	7	0
" " metacarpus between the articulations.....	0	10	0
The length of pelvis between the tub. ilii and ischii	2	1	4
The breadth in a line between both tub. ilii.....	1	11	0
The length of os femoris between the articulations	1	7	0
" " tibia	1	5	6
" " metatarsus.....	0	11	0

Remarks.—This skeleton is the most perfect specimen we have hitherto possessed; but the animal was not full-grown at its death. In the museum there are several bones which indicate somewhat larger individuals. Yet this species, as it came in long *after* the Scandinavian boulder period, and therefore at a much later time than that during which the same species lived in England, has never attained to the same size here as there. The skull which Prof. Owen gives in his 'History of British Fossil Mammals,' London, 1846, p. 498, fig. 208*, is in length 3 feet 1 inch, and the distance between the points of the horncores is more than 3 feet 6 inches, and the width of the forehead is near 11 inches; os metacarpi about 10 inches 5 lines; os metatarsi about 12 inches. At the Hunterian Museum in London there is a horn from the same species of animal found *under* turf in the marl, in which bones of the *Cervus megaceros* occur. From this situation it may be concluded that it is a still *older* and, in fact, much larger form than the preceding. It contains in length, according to the upper curvature, 3 feet 2 inches, and the circumference at the base is 1 foot 7½ inches! With us they neither occur so large nor from so early a period.

Place of abode.—This colossal species of Ox, which is no longer

* Since the foregoing was printed and after this (thirty-fourth) sheet was set up, but not struck off, I made a journey to England, where I first obtained the above-mentioned work, which I was not able to quote before.

to be found on the earth in its wild state, was formerly widely spread over the greater part of Europe, from the present Scania to France and Italy, and from England to the northern and western parts of Asia; as in all those places its fossil bones are found in more recent strata. That great physical changes have occurred in the position of places in Europe, during the long time it sojourned here, is more than probable. South Scania has separated itself from the German continent, by means of that part of the Baltic which now lies between its shores and those of Pomerania; also from Denmark by means of the Sound; and England has also been separated from the great European continent by the Channel. Whether these straits—the Öresund, the Channel and the southern part of the Baltic—were formed at the same time, we do not know with certainty; but from zoological reasons, which shall hereafter be adduced, it will appear that Scandinavia was at a much later period united to the European continent than England. In the present southern part of Scania, in the district south of Söderås, which anciently appears to have formed the northern boundary of the Germanic continent, this species was found in vast numbers; and to judge from the fossil bones dug up from our turf-bogs, they are found here in much greater number than the *Bison*, which existed here contemporaneously with it. During an equally long period, fifteen skeletons or skulls of the *Urus* have been found in Scania and only three of the *Bison*. According to these remains found, there must have lived five times as many of the former species as of the latter. However, although this proportion cannot be determined so exactly by figures, it nevertheless shows that the *Urus* was found here in much larger number than the *Bison*, and this same proportion might hold good in the whole of the western part of Europe*; while on the contrary, the *Bison* appears to have been far more numerous in its eastern parts, and far into west Asia, where it is yet found in great numbers between the Black and the Caspian seas. And that the *Urus* belonged to the western tracts of Europe, which being thickly peopled and cultivated before the eastern parts, might also be a reason that it was, as wild, extirpated or passed over into a tame race; while the *Bison* of the east preserved itself much longer in East Prussia and Poland, and is even now found in a perfectly wild state in those countries most nearly bordering on Asia. This species never could be tamed.

Julius Cæsar describes the *Urox* in his time as being found in

* In Denmark a vast number of bones belonging to the *Urus* have been found, but as yet not one of the *Bison*. The *Bison* skulls which I saw in England belonged, if not to a totally different species, at least to a much older form than ours.

the forests of the Hartz. He says that they in external form and colour fully resembled the common ox, but in point of magnitude they were little less than the elephant. They were both strong and swift, at the same time so spiteful that they spared neither man nor animal when they once caught sight of them. With the chase of these animals the Germanic youth became hardened, and the greater the number of horns of dead oxen they could exhibit, the more highly were they esteemed. These horns, which were larger than the common ox-horn, were frequently edged with silver and used as drinking vessels at great festivals (Jul. Cæsar, Bell. Gall. vi. cap. 28). Also our forefathers and other descendants of the Germanic race appropriated the horns of the Urox to the same use. Pliny affirms that the northern peoples (*Barbari septentrionales*) drank out of Urox-horns, which were so large that one contained an urna* (Plin. Hist. Nat. ii. cap. 37). Solinus mentions, that this horn, on account of its great capacity, was used as a drinking-vessel at royal feasts.

From the hide of the Urox our Germanic forefathers made girdles, and the flesh was eaten as palatable and healthy.

Remarks.—The earlier existence of the Urox as a different species from the Bison can no longer be doubted, seeing that we possess not only the skulls but also entire skeletons of both; but in later times a violent contest has arisen touching the question how far this animal existed in Europe during the age of history, and how far it is this species that is alluded to by the Roman authors under the denomination *Urus* (sometimes by them called *Bubalus*), and by the German writers of the middle age by that of *Ure*; or, whether this name applied only to that one species of *Bison* which German and our own middle-age writers call *Wisent*. It is more especially Professor Pusch of Warsaw who in later times has maintained the latter opinion. If the question be, whether this colossal, flat-foreheaded species of Ox, which we here call *Urus*, lived in Europe, and at various times and even in Scania after the country had been inhabited by men, the answer requires no learned historical or philological research, no wasting of time and trouble which might be employed on more useful objects; it requires for such an object only to visit the Museum at the University of Lund and to inspect one of the Urox skeletons preserved there, which I had the honour of presenting to the Museum, and which in the year 1840 was taken up under

* A Roman *urna* holds in Swedish measure $4\frac{2}{10}$ kans. Pliny's account seems rather exaggerated, partly because a drinking-vessel that holds 4–5 kans was too heavy and too large even for the stoutest drinker; and partly because a horn of the largest Urox-skull, among the Scanian ones which I have before me, did not hold more (counting from the base) than about $1\frac{1}{2}$ kan.

my own eyes from a depth of 10 feet out of a turf-bog near to Önnarp in the district of Wemmenshög in the south of Scania. This skeleton affords an incontestable proof that the animal during its lifetime was in contact with man: it has on its back a palpable mark of a wound from a javelin. Several celebrated anatomists and physiologists of the present day, among whom I need only mention the names of John Müller of Berlin and And. Retzius of Stockholm, have inspected this skeleton, and are unanimous in the opinion, that this hole in question upon the backbone is the consequence of a wound which during the life of the animal was made by the *hand of man*, and therefore not the least doubt can remain on this subject in the mind of any competent judge who examines it. The animal must have been very young, probably only a calf, when it was wounded. The huntsman who cast the javelin must have stood before it. The javelin, which entered at an *extremely acute angle* (which proves a sharp-pointed instrument) on the external part near the edge on the projection of the first lumbar vertebra, has pierced the bone, passed out on the backward side, and pierced through the projection of the next bone. The weapon, which probably remained in the wound, had through suppuration ultimately fallen out. The side of the opening where the javelin entered is more round, surrounded by a callus, and in the inner part is a cavity which shows there had been a great suppuration (Ur-invån. tab. 15. fig. 175). The opposite side of the aperture, which is more oblong in a vertical direction, and shows the form of the weapon, is surrounded by many projections of bone (Ur-inv. tab. 15. fig. 176-177), which manifests that the animal lived at least one or two years after it had been wounded. It was yet young when it died, probably not more than three or four years old, and not unlikely was drowned by falling through the ice into the water, where in after-times a turf-bog has formed over it. The skeleton lay with its head downwards, and one of its horns had penetrated deep into the blue clay which formed the bottom under the turf.

As it is thus practically shown that this species of Ox lived *contemporaneously with man*, and as it is equally certain that the same species of Ox lived here contemporaneously with the *Reindeer* and *Elk* (some of their fossil remains being not unfrequently found together in our old turf-bogs); so it is more than probable that these animals, namely the *Wild Ox with the flat forehead*, the *Reindeer* and the *Elk*, also lived contemporaneously in Germany, from whence they evidently came hither: and this is so much the more certain, as bones of all three have also been dug up from turf-bogs in Pomerania. But now Julius Cæsar relates (Bell. Gall. vi. 26-27), that among the animals which in his time were known and found contemporaneously in the Hercynian

forest in Germany, and which (according to his meaning) were not found in any other place, were *Reindeer*, which he describes but does not name, together with the *Alces* and *Urus*, which he both names and describes. The first-named was in form and the varied colour of its hide like a goat, but in size rather larger; it had branching horns, and these were found with both male and female; they were longer and more elevated than in any other known animal*.

That Cæsar here means the *Wild Reindeer* is evident to every zoologist. In another place (vi. cap. 20) he speaks of the half-savage Germans, in his time, as using the reindeer skin for clothing†. Thus did the Reindeer at least exist in Germany in the historic period, which has also been denied. The second animal found in the Hercynian forest was the *Alces*, and the third was the *Urus*. The last-mentioned (cap. 28) was, according to Cæsar, so colossal that it was only a little less than the elephant; in its external appearance, colour and form, it resembled the tame ox, but it had much larger horns, &c. It is thus possible, and more than possible, that Cæsar's third Hercynian animal was the same as the three which formerly lived contemporaneously in Scania. But to assume with Pusch, that Cæsar's *Urus* was not the flat-foreheaded *Urox*, but the convex-foreheaded *Bison*, would be to reject without reason what Cæsar expressly alleges of the likeness of the *Urus* to the tame ox, both in outward appearance, form, and enormously large horns; for it is certain that the *Bison* never can be said to be, "*specie et colore et figura tauri*;" neither could a Roman, who was accustomed to see the large-sized, long-horned cattle in Italy, of which we have representations even from Cæsar's period, find the horns of the *Bison* so enormously large as Cæsar describes those of the *Urus*‡; for the *Bison*, to judge from the cores on the skulls that have been found among us, even in its wildest state (at least in Cæsar's time), could never have had such large horns as the Italian tame ox. Besides, it is a fact which cannot be disputed, that Roman writers who speak of the *Urus* (by some called *Bubalus*; which appellations were synonymous, according to what Pliny expressly tells us, Hist. Nat. viii. 5) exactly characterize him by his large, wide, open horns, his strength and swiftness, while the characteristic of the *Bison* is *long hair* on the back, neck, or under the chin; and also that no one Roman

* It is quite evident that Cæsar has confused his remarks on the *Reindeer* and the *Elk*, so that at the same period he has inserted something that belonged to the one and something to the other of these species of animals.

† "Pellibus . . . rhenonum tegimentis utuntur."

‡ "Amplitudine cornuum et figura et specie multum a nostrorum bovum cornibus differt," Cæs. vi. 29.

writer ascribes to the *Bison* wide horns, or to the *Urus* long hair.

“Tibi dant variæ pectora tigres,
Tibi villosi terga bisontes
Latisque feri cornibus uri.”—Senec. *Hippol.* Act. 1. v. 63.

“Germania . . . gignit . . . *jubatos Bisontes*, excellentique vi et velocitate *Uri*, quibus imperitum vulgus *Bubalorum* nomen imponit.”—Plin. *Hist. Nat.* viii. cap. 5.

Both these animals were carried to Rome to be viewed by the people in the Circus. Martial and others, who were present and saw them, describe them as of different species.

“Illi cessit atrox *bubalus* atque *bison*.”—Martial, *Spect.* 23.

For my part, I am convinced, from all these combined reasons, that our two largest species of fossil Ox were known to the Romans under the name of *Urus* and *Bison*. They are also spoken of by German writers of the middle age. In the poem of the ‘*Nibelungen*,’ v. 3761, a chase is described which took place in a mountainous and woody tract (v. 3775) in the neighbourhood of Worms, where it is related that Siegfried killed *one Visent* and four *Uri* :—

“Darnach schluch er schiere einen *Visent* und einen Elch,
Starker *Ure* viere und einen grimmen Schelch*.”

In Griffith’s admirable ‘*Animal Kingdom*,’ an English elaboration of Cuvier’s ‘*Règne Animal*,’ to which I had not previously had access, is given in the 4th book, p. 416, an engraving of the *Bos Urus*. The original painting, which was found in the possession of a merchant at Augsburg, and copied for that work by Hamilton Smith, is supposed to have been executed in the beginning of the sixteenth century. This old painting, which is upon a square piece, had in one corner the remains of a (noble) coat of arms and the word *Thur* in gilt German characters almost effaced. If the plate be a true copy of the original, it shows plainly that it was made from a wild and not a tame animal. Such an exterior and such horns no *tame animal* has; but just such horns and with just such a curvature and direction, to judge from the length and direction of the horn-cores, our fossil, great, flat-foreheaded Ox *must* have had. As a further proof of this my conviction, it may be added, that I possess a *war-horn in bronze*, dug from a depth of 6–8 feet out of a turf-bog in southern

* Many have been the conjectures as to what animal is meant by *Schelch*. Büsching has translated it by *Brandhirsch*; others are of opinion that it was the now fossil Irish *Cervus euryceros*; but all this is only conjecture. In the same poem it is said (v. 3756), that Siegfried’s hound (Bracke) started “*ein ungefügten leuwen*” which Siegfried shot, with bow and arrow, and which made but three springs after being shot. But it is probable that by *Leuwen* is meant Lo, the Lynx. In v. 3755 is mentioned “*ein vil starchez halpfwul*,” by which probably is meant a *Glutton* or *Badger*.

Scania, which evidently belongs to that period when the inhabitants there used bronze for their weapons. This *war-horn* in form and curvature wholly resembles the horn-core upon the cranium of an Urox, and has the same long, thin, upturned points, like the ox in Hamilton Smith's drawing. It is more than probable that the inhabitants of the south of Sweden first used the horn of the Urox for their war-horns, and at a later period made themselves horns of bronze in the same form as the former. To this may be added, that Baron Sigesm. Herberstain relates in his 'Rerum Moscoviticarum Commentar.' of the year 1549, p. 33, that in his time, about the latter half of the sixteenth century, there was found in Massovia a species differing from the wild Lithuanian *Zubr*, which in its native land was called *Thur*. They were not found there in any large number, but were kept in some parks, and there were certain burthens laid on the towns to preserve and maintain them. In the same manner the Bison (Pol. *Zubr*) is now kept in a large forest at Bialowieza in Lithuania, by command of the Emperor of Russia*; and, in like manner, a race of wild oxen is still preserved in Scotland in some woody parks † (Compare Bell, Brit. Quadr. p. 422): a stuffed specimen of one of these animals is preserved in the British Museum ‡.

Again, the above-mentioned painting, which Hamilton Smith copied, shows that the *Urus* was without mane, and had pretty smooth hair over the whole body, with the exception of the flat-(not convex) formed forehead, where it was longer and curly; the head was large, the neck thick, the dewlap small, the back straight, and tail long, so that it reached to the middle of the tarsi. The colour was entirely sooty black, the chin alone was white; the horns, which were straight-out, forward, and upward, were whitish with long black points §.

* See the Note of M. Dimitri de Dolmatoff in vol. iii. of the New Series of the 'Annals,' p. 148; and Prof. Owen's notes on the Anatomy of the Bison at p. 288 of the present Number.—Ed. *Ann. Nat. Hist.*

† Notices relative to the wild oxen of Britain will be found in the earlier volumes of the 'Annals:' see vol. ii. p. 274, and vol. iii. pp. 241 and 356.—Ed. *Ann. Nat. Hist.*

‡ It has been said that this "White Scotch Bull" was the last remnant of the *Urus* in its half-wild state; but such is certainly not the case. Our large Holstein cattle come much nearer to the *Urus*, both as to the form of head and the size and direction of the horns. In the Scotch, the horns are curved upward, almost only in *one* direction; the hair on the head and neck is longer and curlier; the forehead is, however, smooth; the colour white, the ears a reddish brown, the head and neck with a gray-brown shade. There is no race of wild oxen of this colour. It is a pity that no cranium has yet been preserved of it; at least not one is to be met with in the Museums in London.

§ Hamilton Smith adds in a note, that this painting agrees with a figure which is found in the 'Stone of Clunia' with a Celtiberian inscription, and which represents a huntsman and a wild ox.

This figure I look upon as genuine, and the best now to be found of the *Urus* in a wild state. The figure which Gesner (in his *History of Animals*, Francof. 1622, lib. i. p. 145) gives of the *Urus* or Polish *Thur* is inferior to the former, yet in all essential points they perfectly agree; the direction of the horns, the long curly hair on the forehead, the short hairy covering of the remaining parts, the length of the tail, &c., are in both the same. Gesner assures us, after Wolfgang Lazius, that the communicated figures of that and of the *Bison* are made from living animals, through the care of Baron Herberstein; and in the text he says: "*Urus* . . . est forma bovis nigri, habet longiora cornua quam bisonis."

It is almost inconceivable how any one will reject so many concordant testimonies, and from such widely different places and times, that during the historical period there lived in Europe an enormously large ox, of the form of the tame ox, of a black colour and long spreading horns, quite dissimilar from the *Bison*. This denial is so much the more unreasonable, as the bones of just such an ox as described by the ancients have been found in the earth, and they have also been found in the same places with the bones of the *Bison*.

That this Wild Ox has contributed to produce the race of our large, long-horned cattle, is more than probable.

When and where this colossal, flat-foreheaded, large-horned Wild Ox first became tamed, we do not know; but certainly it took place in remote antiquity and in a land far distant from us. Among the copies taken from fresco paintings on the sepulchres at Thebes, preserved in the *Egyptian room* of the British Museum, are to be seen groups of cattle, among which we distinguish some as the *Zebu*; others have long horns bent in different directions, and seem already to be tame descendants from the *Urus*. They show a species of small growth, and have the horn-cores (*steglar*) outward, upward, and bent in *one* direction. It appears to me probable that the colossal smooth-foreheaded *Urus* was first tamed either in the south or south-west part of Europe, or already in Asia by some Celtic race; but, nevertheless, long after this it was often found in a wild or half-wild state in the forests of central Europe, even till the beginning or middle of the sixteenth century; that the tame race which sprung therefrom, perhaps like all tame races, became gradually smaller than the wild stocks, but yet larger than other tame races which spring from smaller stocks; and it was this *large breed of black cattle* which the Celtic races brought with them here to the north, and which are spoken of in many passages of our Sagas as belonging to the Jötens (giants). The tame race which sprang from the *Urus* has reached us from the south and west of Europe. It was found probably in Italy already in Cæsar's time; but in the

interior of Germany quite a different race of tame oxen was found, much less in size, with smaller horns, and often without any: this will be treated of in the next article.

This same small race was, without doubt, found among the Germanic tribes also here in Scandinavia, where the inhabitants, accustomed to small cattle, looked upon those introduced by the Jötens as so enormously large. That this race might exist at one and the same time, and in the same country, both wild and tame, is not more extraordinary than that the *reindeer* in Lapland and the *swine* in the whole of south and central Europe should yet exist in the same tracts both in a wild and tame state.

That the wild Urox from the earliest times was an object of chase to the inhabitants here, is proved beyond contradiction by the before-mentioned skeleton preserved in the museum at Lund. This race of wild oxen has never lived in Scandinavia further north than Scania, and even here the fossil remains occur for the most part in the districts of Skytts, Bara and Wemmenhög. Once only have I obtained a skull from Allerum in the district of Luggude.

We perhaps may be astonished at the thought that so colossal an animal as an ox of this race, whose natural food was grass, could winter in a country such as this, where the snow covers the fields often during five to six months of the year, and where the grass during that period either failed or was inaccessible. But our astonishment ceases when we see how the cattle support life during the winter in the forest tracts; with what avidity they bite off and devour the tender branches with their buds, and the catkins of birch, hazel, sallow and other species of willow. Those places where the Urox wintered were certainly thickly grown with the above-named trees, and from them it sustained life. It is not more surprising than to see the Elk live and winter in climates which are much more severe than that in which the Urox existed.

[To be continued.]

XXX.—*Observation of some of the Phases of Development of the Trichodina pediculus* (?). By J. T. ARLIDGE, A.B., M.B. (Lond.), Member and Student in Anatomy of the Royal College of Surgeons.

[With a Plate.]

IN examining the contents of a bottle of water procured from a pool in the swampy part of Hampstead Heath, in the past month (July), and during the drought prevailing at that time, I encountered an animalcule which I determined to be, most probably, the *Trichodina pediculus* (Ehr.). Perceiving that the animal was disposed to remain in the same locality under the mi-